MONITORING SUSPICIOUS EVENTS IN A CELLULAR NETWORK

BACKGROUND

[0001] 1. Field

[0002] Communication systems, including cellular networks, and the devices that are connected to them, can have both legitimate and illegitimate uses. Such communication systems, including systems that utilize, permit, or leverage machine-type-communications, may benefit from monitoring for suspicious events.

[0003] 2. Description of the Related Art

[0004] The evolved packet system (EPS), the successor of general packet radio system (GPRS), provides radio interfaces and packet core network functions for broadband wireless data access. EPS core network functions include the mobility management entity (MME), the packet data network gateway (PDN-GW) and the Serving Gateway (S-GW). An example of an evolved packet core architecture is illustrated in FIG. 1 and is described by third generation partnership project (3GPP) technical specification (TS) 23.401, which is incorporated herein by reference in its entirety. A common packet domain core network can be used for both radio access networks (RANs), the global system for mobile communication (GSM) enhanced data rates for GSM evolution (EDGE) radio access network (GERAN) and the universal terrestrial radio access network (UTRAN).

[0005] For machine-type-communication (MTC) a functional entity called MTC interworking function (MTC-IWF) and several new interfaces, including S6m, Tsp, Tsms, T5a/b/c and T4, have been introduced to the 3GPP architecture. FIG. 2 illustrates machine-type-communication additions to the 3GPP architecture, as well as the various interfaces identified. The MTC-IWF and the new interfaces in 3GPP Release 11 (Rel 11) can, for example, enable triggering of devices with or without a mobile subscriber integrated services digital network number (MSISDN) from an internal or external MTC server. The triggering of the devices may be, for example, in order to establish a packet data network (PDN) connection and/or packet data protocol (PDP) context. A 3GPP architecture for machine-type communication is discussed in 3GPP TS 23.682, which incorporated herein by reference in its entirety.

SUMMARY

[0006] According to certain embodiments, a method includes receiving a monitoring request regarding a user equipment or a category of devices. The method also includes performing a monitoring activity regarding the user equipment or the category of devices with respect to at least one suspicious event. The method further includes responding to the monitoring request indicating whether monitoring will be performed for the user equipment or the category of devices.

[0007] In certain embodiments, a method includes requesting monitoring of a user equipment or a category of devices with respect to at least one suspicious event. The method also includes receiving a response to the monitoring request, wherein the response indicates a registration status of the monitoring.

[0008] A method, according to certain embodiments, includes receiving a request for monitoring a user equipment or category of devices with respect to at least one suspicious event. The method also includes determining whether the

monitoring is permitted. The method further includes responding to the request based on whether the monitoring is permitted.

[0009] According to certain embodiments, a method includes monitoring for a suspicious event with respect to a user equipment or a category of devices for which monitoring has been requested by a requestor. The method also includes detecting an occurrence of the suspicious event with respect to the user equipment or the category of devices. The method further includes reporting the occurrence to the requestor.

[0010] A method, in certain embodiments, includes receiving a report of suspicious activity with respect to a user equipment or a category of devices for which monitoring has been requested by a requestor. The method also includes forwarding the report of the suspicious activity to the requestor.

[0011] A method, according to certain embodiments, includes receiving a report of suspicious activity with respect to a user equipment or a category of devices for which monitoring has been requested by a user or subscriber of the user equipment. The method also includes reporting the suspicious activity to the user or the subscriber.

[0012] In certain embodiments, an apparatus includes at least one processor and at least one memory including computer program code. The at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to receive a monitoring request regarding a user equipment or a category of devices. The at least one memory and the computer program code are also configured to, with the at least one processor, cause the apparatus at least to perform a monitoring activity regarding the user equipment or the category of devices with respect to at least one suspicious event. The at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus at least to respond to the monitoring request indicating whether monitoring will be performed for the user equipment or the category of devices.

[0013] According to certain embodiments, an apparatus includes at least one processor and at least one memory including computer program code. The at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to request monitoring of a user equipment or a category of devices with respect to at least one suspicious event. The at least one memory and the computer program code are also configured to, with the at least one processor, cause the apparatus at least to receive a response to the monitoring request, wherein the response indicates a registration status of the monitoring.

[0014] An apparatus, according to certain embodiments, includes at least one processor and at least one memory including computer program code. The at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to receive a request for monitoring a user equipment or category of devices with respect to at least one suspicious event. The at least one memory and the computer program code are also configured to, with the at least one processor, cause the apparatus at least to determine whether the monitoring is permitted. The at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus at least to respond to the request based on whether the monitoring is permitted.

[0015] An apparatus, in certain embodiments, includes at least one processor and at least one memory including com-